

CLAIMS

1. In a touch screen assembly having at least one touch input device adapted to provoke a touch detection on a touch screen, the improvement
5 comprising:
a conductive layer joined to said touch screen;
an RF generator connected to said conductive layer to create an EM standing wave in said conductive layer;
signaling means in said at least one touch input device for receiving power
10 from said EM standing wave and emitting a device signal;
said touch screen assembly including detection means for receiving said device signal and determining the location of said at least one touch input device on said touch screen.
- 15 2. The touch screen assembly of claim 1, wherein said signaling means includes rectifying means for generating separate positive and negative waveforms.
- 20 3. The touch screen assembly of claim 2, said at least one touch input device including a voltage regulator to regulate said positive waveform and generate a power signal.

4. The touch screen assembly of claim 3, said at least one touch input device including a microprocessor powered by said power signal.

5. The touch screen assembly of claim 2, said at least one touch input device including an RF attenuator, said negative waveform being conducted to said RF attenuator.

6. The touch screen assembly of claim 5, said signaling means including means for driving said RF attenuator to produce a coded pulse train that comprises said device signal.

7. The touch screen assembly of claim 6, said at least one touch input device including a user-operated switch, and means for signaling operation of said switch.

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8. The touch screen assembly of claim 7, wherein said means for signaling operation of said switch includes means for inverting said coded pulse train.

9. The touch screen assembly of claim 8, said touch screen assembly further including means for detecting said inverted coded pulse train and distinguishing operation of said switch.

10. The touch screen assembly of claim 1, wherein said device signal is a CDMA signal.

11. The touch screen assembly of claim 1, wherein said detection means
5 includes a plurality of sensors connected to said conductive layer.

12. The touch screen assembly of claim 11, wherein each of said sensors is connected to sensor signal rectifier means for generating a negative waveform corresponding to the respective sensor signal.

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13. The touch screen assembly of claim 12, wherein said negative waveform is conducted to an envelope detector to remove RF components of said negative waveform.

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14. The touch screen assembly of claim 13, wherein the output of said envelope detector is connected to voltage divider means for normalizing the strength of the sensor signal.

15. The touch screen assembly of claim 14, wherein the output of said
20 voltage divider means is connected to an analog/digital converter.

16. The touch screen assembly of claim 15, wherein the output of said analog/digital converter is conducted to CDMA detector means for detecting a CDMA code in the sensor signal.

5 17. The touch screen assembly of claim 6, further including a plurality of said touch input devices, each generating a respective coded pulse train that uniquely identifies the respective touch input device.

10 18. The touch screen assembly of claim 17, wherein said detection means includes means for receiving and detecting multiple coded pulse trains from said plurality of said touch input devices.

15 19. The touch screen assembly of claim 18, further including means for controlling said RF generator to add a synch signal to the output of said RF generator.

20 20. The touch screen assembly of claim 19, wherein said synch signal comprises at least one short-period interruption of said RF signal.

20 21. The touch screen assembly of claim 17, wherein said coded pulse trains comprise CDMA signals.

22. The touch screen assembly of claim 21, wherein said detection means includes matched-filter means for separating and detecting said CDMA signals of said plurality of touch input devices.

5 23. The touch screen assembly of claim 1, wherein a device power circuit is established by user touch applied to said at least one touch input device, said power circuit extending from said conductive layer through said at least one touch input device and thence through the body of the user to ground.

10 24. A method for operating a touch screen assembly that has a touch screen and at least one touch input device, including the steps of:
 providing a conductive layer joined to the touch screen;
 generating an EM standing wave in said conductive layer;
 said at least one touch input device receiving a power signal from said EM
15 standing wave and emitting a device signal;
 said touch screen assembly receiving said device signal and determining the location of said at least one touch input device on said touch screen.

 25. The method for operating a touch screen assembly of claim 24, further
20 including the step of rectifying said power signal in said at least one touch input device to generate separate positive and negative waveforms.

26. The method for operating a touch screen assembly of claim 25, further including the step of rectifying the positive waveform to provide operating power to a microprocessor.

5 27. The method for operating a touch screen assembly of claim 25, further including the step of conducting the negative waveform to an RF attenuator, and driving said RF attenuator to produce a coded pulse train that comprises said device signal.

10 28. The method for operating a touch screen assembly of claim 27, further including the step of providing a user-operated switch in said at least one touch input device.

 29. The method for operating a touch screen assembly of claim 28, further
15 including the step of signaling actuation of said user-operated switch by inverting said coded pulse train.

 30. The method for operating a touch screen assembly of claim 27, further including providing a plurality of said touch input devices, each generating a
20 respective coded pulse train that uniquely identifies the respective touch input device.